

REMARKS

The Office Action dated June 10, 2005, has been received and carefully noted. The following remarks are submitted as a full and complete response thereto. Claims 1-10 are pending in the present application. Claims 7-10 are allowed. Accordingly, claims 1-6 are respectfully submitted for consideration.

The Applicants wish to thank the Examiner for allowing claims 7-10 and indicating allowable subject matter in claims 2 and 3/2-5/2. Claims 2 and 3/2-5/2 were not placed in independent form as they depend from claim 1, which is allowable for the reasons submitted below.

Claims 1, 3/1, 4/1, 5/1 and 6 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Akiyama et al. (U.S. Patent No. 6,218,675 B1, "Akiyama") in view of Pu (U.S. Patent No. 6,034,377). With respect to independent claims 1 and 6, Akiyama is cited for disclosing many of the claimed elements of the invention with the exception of a plurality of scan electromagnets being for one direction and a controller controlling the plurality of the scan electromagnets so that kicks provided by the plurality of scan electromagnets are combined in the one direction to form a collimated irradiation field at an exit of the final deflection electromagnet. Pu is cited for curing this deficiency. The Applicants respectfully submit that claims 1, 3/1, 4/1, 5/1 and 6 recite subject matter that is neither disclosed nor suggested by the cited references.

With respect to claims 1 and 6, the Examiner took the position that the Applicants need to show evidence of why the suggested modification of Akiyama by Pu cannot provide a parallel beam, specifically the claimed collimated irradiation field at an exit of the final deflection electromagnet. The Applicants respectfully submit this evidence in

the attached Declaration under 37 C.F.R. § 1.132. The Declaration is attested to by Mr. Tachikawa, one of the inventors, who holds a doctorate in Physics. The Applicants respectfully submit that the Declaration supports the arguments presented in the previous Responses that the invention recited by the pending claims are patentable over the teachings of the combination of Akiyama and Pu.

With respect to claims 1 and 6, the Applicants submit that the combination of Akiyama and Pu fails to disclose or suggest the claimed features of the invention. Claims 1 and 6 recite a controller controlling the plurality of scan electromagnets so that kicks provided by the plurality of said scan electromagnets are combined in said one direction to form a collimated irradiation field at an exit of said final deflection electromagnet. The Office Action took the position that it would have been obvious to modify the charged particle beam irradiation apparatus disclosed by Akiyama such as replacing the plurality of scanning electromagnets by the ones having kicks superimposed in one direction as disclosed in Pu to form a collimated irradiation field at the entrance side of the final deflection magnet in order to produce a collimated irradiation field at the exit side of the final deflection magnet. See the paragraph bridging pages 2-3 of the Office Action.

As shown in Figs. 5A and 5B of Akiyama, the two scanning electromagnets 100, 110 deflect a beam in two orthogonal directions, to scan the beam in a two-dimensional plane, not in one direction. The first scanning electromagnet 100 of Akiyama deflects the beam **in an X direction parallel** to the deflection plane (X-Z plane) and the second scanning electromagnet 110 deflects the beam **in a Y-direction**. See column 5, lines 44-54 of Akiyama. As acknowledged in the Office Action, the two scanning

electromagnets 100, 110 are disposed to work in two different directions (in the X- **and** Y-axes), not in one direction, as recited in claims 1 and 6. Therefore, kicks by the two scanning electromagnets 100, 110 in Akiyama are not combined in the claimed one direction to form a collimated irradiation field, as recited in claims 1 and 6.

Pu was cited for curing this deficiency. Scanning electromagnets 33 and 35 in Pu are used to expand a beam in one and the same direction. The scanning electromagnets 33 and 35 in Pu must be rotated around a rotating axis 37 to irradiate in a two-dimensional plane. See column 4, lines 15 and 16, and Figs. 3 and 4 of Pu. As shown in Fig. 3 of Pu, the first scanning electromagnet 33 **diverges** incident beam 31, and then, the second scanning electromagnet 35 **converges** the diverted beam to **obtain the parallel beam** shown in the Fig. 3.

The Applicants submit that if Akiyama and Pu are combined as suggested in the Office Action, then the resulting beam of Akiyama would be **diverged in the X-direction** by the first scanning electromagnet 33 and **converged in the Y-direction** by the second scanning electromagnet 35. Furthermore, even if the second scanning electromagnet 35 is placed upstream of the bending electromagnet 9 in Akiyama, as suggested by the Office Action, the second scanning electromagnet 35 can only converge the incident beam, but cannot form a parallel beam.

The Applicants also submit that modifying the scanning electromagnets of Akiyama with the scanning electromagnets of Pu as suggested by the Office Action changes the principle of operation of the Akiyama rendering Akiyama unsuitable for irradiating a target object with a charged particle beam. Under U.S. patent practice, MPEP § 2143.01, if a proposed modification would render the prior art invention being

modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification. In re Gordon, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984). As set forth above, the Applicants submit that modifying Akiyama with Pu would result in diverging and converging beams in the apparatus of Akiyama and not a parallel beam. Accordingly, the Applicants submit that such a modification, as suggested by the Office Action, would render Akiyama unsatisfactory for its intended purpose of irradiating a target object with a charged particle beam, and thus, does not render claims 1 and 6 obvious.

Since the combination of Pu and Akiyama does not disclose or suggest a plurality of scan electromagnets for one direction provided on an entrance side of a final deflection electromagnet and kicks provided by a plurality of scan electromagnets combined in said one direction to form a collimated irradiation field, the Office Action has failed to make a *prima facie* case of obviousness for purposes of a rejection of claims 1 and 6 under 35 U.S.C. § 103.

Under U.S. patent practice, the PTO has the burden under §103 to establish a *prima facie* case of obviousness. In re Fine, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988). Both the case law of the Federal Circuit and the PTO itself have made clear that where a modification must be made to the prior art to reject or invalidate a claim under §103, there must be a showing of proper motivation to do so. The mere fact that a prior art reference could arguably be modified to meet the claim is insufficient to establish obviousness. The PTO can satisfy this burden only by showing some objective teaching in the prior art or that knowledge generally available to one of ordinary skill in the art would lead that individual to combine the relevant teachings of the references.

Id. In order to establish obviousness, there must be a suggestion or motivation in the reference to do so. See also In re Gordon, 221 USPQ 1125, 1127 (Fed. Cir. 1984) (prior art could not be turned upside down without motivation to do so); In re Rouffet, 149 F.3d 1350 (Fed. Cir. 1998); In re Dembiczak, 175 F.3d 994 (Fed. Cir. 1999); In re Lee, 277 F.3d 1338 (Fed. Cir. 2002). The Office Action restates the advantages of the present invention to justify the combination of references. There is, however, nothing in the applied references to evidence the desirability of these advantages in the disclosed structure.

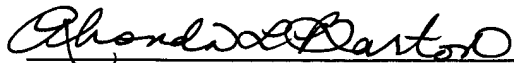
For at least the combination of foregoing reasons, the Applicants respectfully submit that the combination of Pu and Akiyama fails to disclose or suggest the present invention as claimed in claims 1, 3/1, 4/3/1, 5/1 and 6. Accordingly, the Applicants respectfully request withdrawal of the above-noted rejections, allowance of claims 1-6 and the prompt issuance of a Notice of Allowability.

Should the Examiner believe anything further is desirable in order to place this application in better condition for allowance, the Examiner is requested to contact the undersigned at the telephone number listed below.

In the event this paper is not considered to be timely filed, the Applicants respectfully petition for an appropriate extension of time. Any fees for such an extension, together with any additional fees that may be due with respect to this paper,

may be charged to counsel's Deposit Account No. 01-2300, **referencing Attorney Docket. No. 107292-00023.**

Respectfully submitted,



Rhonda L. Barton
Attorney for Applicants
Registration No. 47,271

Customer No. 004372

ARENT FOX PLLC
1050 Connecticut Avenue, N.W., Suite 400
Washington, D.C. 20036-5339
Tel: (202) 857-6000
Fax: (202) 638-4810

RLB/wbp

Enclosure: Declaration Under 37 C.F.R. § 1.132
Declaration Exhibit, Figure A
Petition for Extension of Time (two months)

TECH/378922.1